

THE MAMMALS OF ENGANO ISLAND, WEST SUMATRA.

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The mammal fauna of Engano Island was first made known in 1894, when Mr. Oldfield Thomas published an account of the collections made there three years before by Doctor Modigliani.^a Twelve species, mostly bats, were recorded, one of which, *Pteropus modiglianii*, was described as new. A second new species has recently been described from Doctor Modigliani's collection, *Rhinolophus calypso* Andersen,^b but with this exception no further accounts of the mammals have appeared.

Engano was visited in November and December, 1904, by Dr. W. L. Abbott. He collected about 70 mammals, all of which have been presented to the United States National Museum. Among them are three not taken by Doctor Modigliani.

Doctor Abbott's description of the island is as follows:

"Engano lies about 60 miles south of [Manna Point on] the coast of southwest Sumatra. It is about 18 miles long and contains about 140 square miles. Near the coast it is flat, but in the interior it rises so that the whole interior looks like a low, flat hill when viewed from the sea. On the charts the highest point is given as 1,060 feet, but this is undoubtedly too high. The whole coast line is formed by a reef from $\frac{1}{2}$ mile to $1\frac{1}{2}$ miles wide. The best anchorage is behind Pulo Dua, in the bay at the southeast corner of the island. The peculiar natives are rapidly dying out, only 441 being left on December 5, 1904. The population was 6,500 in 1868. The country is covered with scrub and forest. Much of it has evidently been cleared and is now overgrown. A good road starts from opposite Pulo Dua and runs two-thirds around the island, about 40 miles. The soil appears to be very fertile, and there is but little rock visible on the surface. The rainfall is abundant, and there are many streams and rivers. Pulo Dua is about $\frac{1}{3}$

^aOn some mammals from Engano Island, west of Sumatra. Ann. Mus. Civ. di Stor. Nat. di Genova, (2) XIV, pp. 105-110. April 10, 1894.

^bProc. Zool. Soc. London, 1905, II, p. 134. October 17, 1905. Proc. U. S. Nat. Mus., XXIX, p. 657. March 7, 1906.

mile long and nearly covered with cocoanuts. It lies about 1 mile from the main island. There is a kampong on it, where the Malay mentri (government clerk) lives. Pulo Mirbau is about $1\frac{1}{4}$ miles south of Pulo Dua. It contains 10 or 15 acres. There were here many fruit pigeons and a camp of *Pteropus*."

SYSTEMATIC LIST OF SPECIES.

Family SUIDÆ.

SUS BABI Miller?

1906. *Sus babi* MILLER, Proc. U. S. Nat. Mus., XXX, 1906, p. 752.

The two specimens procured, the skin and skull of a young male (No. 140958) and the skull of an adult female (No. 140959), are, as already stated in the original description of *Sus babi*, not sufficient to make possible a definite identification of the Engano pig. Doctor Abbott writes of the animal as follows:

"Pigs are very common in Engano, but are never kept tame. They are said to be descended from animals which swam ashore from a stranded ship, perhaps twenty-five years ago. The natives say that previous to this none existed. One afternoon, while I was on shore, a pig swam off from the mainland bound for Pulo Dua. He had nearly reached the schooner's anchorage when the noise made by the crew frightened him and he turned back to the main island. There were no boats by the schooner at the time or the animal could readily have been caught."

Family VIVERRIDÆ.

PARADOXURUS HERMAPHRODITUS (Pallas).

1894. *Paradoxurus hermaphroditus* THOMAS, Ann. Mus. Civ. di Stor. Nat. di Genova, (2) XIV, p. 105. April 10, 1894.

An adult female (No. 141026) was taken on the main island, November 10, 1904. It closely resembles Sumatran specimens. Mammar, 4. Weight, 2.27 kg. Measurements: Head and body, 495 mm.; tail, 410; hind foot, 83; skull, upper length, 88; condylobasilar length, 95.6; zygomatic breadth, 52.8.

"Musangs were very common, and their droppings could be seen everywhere in the paths. I did not succeed in trapping any, however, and the one specimen taken was brought in by natives. It is doubtless an introduced species. There were a few on Pulo Dua."

One specimen was taken by Modigliani on Pulo Dua.

Family MURIDÆ.

MUS near RATTUS.

1894. *Mus rattus* var. THOMAS, ANN. MUS. CIV. DI STOR. NAT. DI GENOVA, (2) XIV, p. 109. April 10, 1894.

Four specimens were taken on Pulo Dua and a fifth on the main island. Doctor Abbott remarks that rats were common about the houses but were scarce in the forest.

Modigliani collected one specimen on Pulo Dua.

MUS ENGANUS, new species.

1894. ?*Mus* sp. THOMAS, ANN. MUS. CIV. DI STOR. NAT. DI GENOVA, (2) XIV, p. 110, April 10, 1894.

Type.—Adult male (skin and skull). No. 140976, U.S.N.M. Collected on Engano Island, December 4, 1904, by Dr. W. L. Abbott. Original number, 3823.

Characters.—General appearance not unlike a light-colored *Mus norvegicus*, but tail longer than head and body, and fur of a soft, almost silky texture, except along middle of back, where it becomes somewhat harsh. Skull with rostrum fully one-half deeper and broader than in *Mus norvegicus*; maxillary teeth with lateral cusps relatively more developed. Tail with 12 rings to the centimeter at middle.

Fur and color.—The fur is of a soft, almost silky texture, though without trace of woolliness. On sides the hairs are about 12 mm. long. On back the mass of the fur increases to about 18 mm. in length, at the same time becoming somewhat harsh in texture, while there is an evident sprinkling of slender, grooved bristles 35 mm. long. These bristles are so slender as to resemble ordinary hairs, but their grooved character can be detected with a lens. Whiskers long and soft, reaching to axillæ. Hairs on tail slightly exceeding length of scales, but becoming somewhat longer near tip, though without forming pencil.

Underparts pale smoke-gray, the hairs becoming darker (about gray No. 6) basally. On sides and cheeks the gray becomes suffused with a dull, pale, ochraceous-buff, this decidedly predominating on back, crown, and face, where it is further darkened by the sprinkling of black bristle hairs. Muzzle washed with hair-brown. Feet scantily sprinkled with fine, light-gray hairs. Tail uniform, dark-brown throughout.

Skull and teeth.—In general appearance the skull somewhat resembles that of a large *Mus norvegicus*, but it is at once distinguishable by the greatly increased breadth and depth of the rostrum, each of which is decidedly more than half the length of nasals. The nasals are abruptly truncated in front, a character which adds to the peculiar

appearance of the rostrum. Anterior zygomatic root essentially as in *Mus norvegicus*. Nasals terminating posteriorly about in line with premaxillaries. Audital bullæ and entire ventral aspect of skull (broad rostrum excepted) as in *Mus norvegicus*.

The maxillary teeth differ from those of typical *Mus* in the greater development and more evident demarkation of the lateral series of cusps, both outer and inner. There are, however, no unusual elements in the teeth. The mandibular teeth show no appreciable peculiarities.

Measurements.—Total length, 485 mm.: head and body, 228; tail, 257; hind foot, 46 (43); ear from meatus, 19; ear from crown, 13; width of ear, 14.4; skull, upper length, 44.6; condylobasal length, 44; basilar length, 38; palatilar length, 22.8; diastema, 13; length of nasals, 15.2; greatest breadth of nasals, 6; greatest breadth of rostrum, 8.4; least depth of rostrum, 9; zygomatic breadth, 23.4; interorbital constriction, 7; breadth of brain case above roots of zygomata, 17.4; mastoid breadth, 16.6; maxillary tooth row (alveoli), 8.6; mandible, 27; mandibular tooth row (alveoli) 8.

Specimens examined.—One, the type.

Remarks.—For the sake of convenience, I have compared this remarkably distinct species with *Mus norvegicus*, an animal with which it probably has no near relationship. The strong development of the lateral cusps of the maxillary teeth removes it from the typical group of *Mus*, but in the present unsatisfactory state of this genus I am not able to decide as to the forms with which it should be placed.

- PTEROPUS ENGANUS, new species.

1894. *Pteropus hypomelanus* THOMAS, ANN. MUS. CIV. DI STOR. NAT. DI GENOVA, (2) XIV, p. 106, April 10, 1894.

Type.—Adult male (skin and skull), No. 140966, U.S.N.M. Collected on Pulo Dua, Engano, November 4, 1904, by Dr. W. L. Abbott. Original number, 3774.

Characters.—Similar to *Pteropus lepidus* Miller, but smaller, and with lack darker than the mantle. Larger than *Pteropus hypomelanus* Temminck.

Color.—Type: Back a rather dark hair-brown, darkest and clearest anteriorly, though everywhere somewhat lightened by a sprinkling of silvery hairs, and along edges of membranes a little suffused with ochraceous-buff. Mantle pale tawny-ochraceous, darkening on sides of neck through hazel to chestnut, this in turn blackening on under-side of neck. Behind this blackish area the underparts are much like back, except that the brown is darker, the silvery hairs are absent, and the lighter suffusion is more nearly hazel. Head a grizzled drabby gray, many of the hairs with noticeable silvery reflections in certain lights.

Skull and teeth.—The skull and teeth resemble those of *Pteropus lepidus*, differing merely in their generally smaller size. Mandible noticeably more slender than in the related species.

Measurements.—For external measurements see table, page 824. Cranial measurements of type: upper length, 61.2 mm.; condylobasal length, 60; basilar length, 55; median palate length, 30.6; palatal breadth between anterior molars, 12; zygomatic breadth, 34; least interorbital breadth, 8.4; constriction behind postorbital processes, 7.4; breadth between tips of postorbital processes, 25.6; greatest breadth of brain case above roots of zygomata, 22; greatest depth of brain case, 17; occipital depth, 11.8; depth of rostrum at middle of diastema, 7.8; mandible, 48.8; maxillary tooth row exclusive of incisors (alveoli) 23.4; mandibular tooth row exclusive of incisors (alveoli), 26.6.

Specimens examined.—Thirty-two from Engano, Pulo Dua, and Pulo Mirbau.

Remarks.—The color phase represented in the type occurs in the majority of the specimens. In some, however, the silvery hairs on the back predominate so as to make the color a light gray, while in others the ochraceous-buff wash is so increased as to conceal the brown. The gray phase and the buff phase are connected with the normal dark phase by intermediates of every degree, but the series of skins show no direct intergradation between the two pale extremes.

This animal appears to be not closely allied to *Pteropus lepidus* of the South China Sea islands, but is readily distinguishable by its smaller size and invariably light mantle. It is undoubtedly larger than *Pteropus hypomelanus*, the shortest forearm in the series measuring 122 mm., while that of the type of the Ternate species measures, according to Dobson, 119 mm.

PTEROPUS MODIGLIANII Thomas.

1894. *Pteropus modiglianii* THOMAS, Ann. Mus. Civ. di Stor. Nat. di Genova, (2) XIV, p. 106. April 10, 1894.

Twelve specimens were taken by Doctor Abbott, mostly on the main island. Two are recorded by Thomas in the original description.

In color the skins are very uniform, the only variation being a slight tendency in some specimens for the rump and flanks to become suffused with dull ochraceous. While this species is rather closely related to *Pteropus natalis*, of Christmas Island, I fail to discover any strong resemblance between it and the much larger, short-haired *Pteropus nicobaricus*, to which it has been compared.

Regarding the occurrence of the two species of *Pteropus*, Doctor Abbott writes:

“The rufous-naped species [*enganus*] was very common on Pulo Dua and was generally found hanging and feeding on coconut trees. The black one [*modiglianii*] was not numerous on Pulo Dua. On the main

island it appeared to be the more numerous. It generally was found feeding on wild fruit, and did not frequent the cocoanut trees."

Measurements of *Pteropus*.

Name.	Locality.	Number.	Sex.	Head and body.	Tibia.	Foot.	Forearm.	Thumb.	Second finger.	Third finger.	Fourth finger.	Fifth finger.
<i>Pteropus euganus</i> .	Engano	140961	Male ...	203	58.0	42.3	128.0	56.8	96.0	245	195	175
Do	do	140965	do	202	56.0	41.4	126.0	55.0	94.4	235	189	166
Do	do	140966	do	203	53.0	41.0	125.0	57.0	93.0	238	191	167
Do	do	140964	Female.	201	51.0	39.0	123.0	52.0	94.0	231	178	162
Do	do	140973	do	207	53.0	39.0	124.6	53.6	93.6	238	186	172
Do	do	140987	do	207	51.0	43.0	126.0	48.8	90.4	233	187	169
<i>Pteropus leptodus</i> .	Big Tambe- lan Island.	101649	Male ...	229	63.0	43.0	135.0	61.0	99.0	260	205	184
Do	do	101651	do	222	65.0	43.0	136.0	62.0	100.0	260	207	185
Do	do	101650	Female.	216	57.0	41.0	128.0	59.0	96.0	255	200	177
Do	Saddle Island.	101670	do	222	58.0	40.0	133.0	61.0	103.0	255	200	175
Do	Pulo Laut ..	104740	Male ...	230	61.0	44.0	141.0	60.0	103.4	270	215	193
Do	do	104741	Female.	215	59.0	42.6	137.0	58.8	104.6	263	206	182
<i>Pteropus modiglianii</i> .	Engano	140977	Male ...	240	62.4	45.0	139.0	62.4	105.0	262	207	186
Do	do	140978	do	242	63.4	46.0	59.0	105.4	267	210	187
Do	do	140985	do	215	63.0	44.0	135.0	50.0	100.0	258	205	180
Do	do	140979	Female.	220	58.0	39.0	134.0	54.6	98.6	257	202	194
Do	do	140980	do	222	61.4	46.4	58.6	101.0	263	204	177
Do	do	140984	do	225	58.4	48.4	139.0	60.4	109.0	276	209	186

^aType.

ROUSETTUS AMPLEXICAUDATUS (Geoffroy).

1894. *Xanthorpygia amplexicaudata* THOMAS, Ann. Mus. Civ. di Stor. Nat. di Genova, (2) XIV, p. 108. April 10, 1894.

Recorded by Thomas, but not taken by Doctor Abbott.

Family RHINOLOPHIDÆ.

RHINOLOPHUS CALYPSO (Andersen).

1894. *Rhinolophus affinis* THOMAS, Ann. Mus. Civ. di Stor. Nat. di Genova, (2) XIV, p. 108. April 10, 1894.

1905. *Rhinolophus calypso* ANDERSEN, Proc. Zool. Soc. London, 1905, II, p. 134. October 17, 1905.

Collected by Modigliani in 1891. Seven taken by Doctor Abbott.

HIPPOSIDEROS DIADEMA (Geoffroy).

1894. *Hipposiderus diadema* THOMAS, Ann. Mus. Civ. di Stor. Nat. di Genova, (2) XIV, p. 108. April 10, 1894.

HIPPOSIDEROS GALERITUS (Cantor).

1894. *Hipposiderus galeritus* THOMAS, Ann. Mus. Civ. di Stor. Nat. di Genova, (2) XIV, p. 108. April 10, 1894.

HIPPOSIDEROS BICOLOR (Temminck).

1894. *Hipposiderus bicolor* THOMAS, Ann. Mus. Civ. di Stor. Nat. di Genova, (2) XIV, p. 108. April 10, 1894.

These three bats were taken by Modigliani, but were not observed by Doctor Abbott.

Family VESPERTILIONIDÆ.

PIPISTRELLUS IMBRICATUS (Horsfield).

1894. *Vesperugo imbricatus* THOMAS, Ann. Mus. Civ. di Stor. Nat. di Genova (2), XIV, p. 108. April 10, 1894.

Two specimens (females, Nos. 141018 and 141019) taken on Pulo Dua November 16, 1904, are evidently referable to the species recorded by Thomas.

KERIVOULA ENGANA, new species.

Type.—Adult male (in alcohol), No. 141020, U.S.N.M. Collected on Pulo Dua, Engano, November 3, 1904, by Dr. W. L. Abbott. Original number, 3766.

Characters.—Like *Kerivoula hardwickii*, but larger.

Color.—After a year's immersion in alcohol the general color is very nearly broccoli-brown above, becoming yellower on head and darkening about to wood-brown below, the hairs everywhere a dark hair-brown on basal half, those of the back with a broad buffy-gray area between this and the broccoli-brown tips; ears and membranes dark brown.

Skull and teeth.—The skull and teeth do not appear to differ appreciably from those of *Kerivoula hardwickii* except in their noticeably greater size.

Measurements.—Measurements of the two specimens collected (those of the type first): Total length, 85 (85) mm.; head and body, 43 (41); tail, 42 (44); tibia, 17.6 (17.4); foot, 8 (7.6); forearm 33, (34.4); thumb, 8 (7.6); second finger, 35 (37); third finger, 70 (74); fourth finger, 51 (56); fifth finger, 48 (52); ear from meatus, 13 (14.6); ear from crown, 11.6 (12.4); width of ear, 13 (12); skull, greatest length, 14.6; condylobasal length, 13.6; palatal length, 7.8; zygomatic breadth, 9; breadth of braincase, 7.4; height of braincase through audital bulla, 6.6.

Specimens examined.—Two, both from Pulo Dua.

Remarks.—The Engano *Kerivoula* is readily distinguishable from *K. hardwickii* of Java by its generally larger size, a character particularly evident in the skull and foot. The color is throughout yellower than in the Javan form.

Family EMBALLONURIDÆ.

EMBALLONURA SEMICAUDATA (Peale).

1894. *Emballonura semicaudata* THOMAS, Ann. Mus. Civ. di Stor. Nat. di Genova, (2) XIV, p. 109, April 10, 1894.

Recorded by Thomas, but not taken by Doctor Abbott. It seems improbable that this animal is the same as the true *Emballonura semicaudata* of Samoa.